

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JIE CHENG et al.

Appeal No. 2000-0866
Application No. 08/852,829

ON BRIEF

Before McCANDLISH, Senior Administrative Patent Judge, STAAB and
NASE, Administrative Patent Judges.

NASE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1, 2, 4, 5, 8, 9, 15 and 16, which are all of the claims pending in this application.

We REVERSE.

Appeal No. 2000-0866
Application No. 08/852,829

Page 2

BACKGROUND

The appellants' invention relates to virtual vehicle sensors which use neural networks trained using a simulation model to monitor a vehicle parameter (specification, p. 1). A copy of the claims under appeal is set forth in the appendix to the appellants' brief.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Keeler et al. 1996 (Keeler) 1995)	5,548,528	Aug. 20, (filed Jan. 30,
Puskorius et al. 1997 (Puskorius '750) 1994)	5,625,750	Apr. 29, (filed June 29,
Puskorius et al. 1998 (Puskorius '700) 1996)	5,781,700	July 14, (filed Feb. 5,

Claims 1, 2, 4, 5, 8, 9, 15 and 16 stand rejected under 35 U.S.C. § 103 as being unpatentable over Puskorius '700 in view of Puskorius '750.

Claims 1, 2, 4, 5, 8, 9, 15 and 16 stand rejected under 35 U.S.C. § 103 as being unpatentable over Puskorius '700 in view of Keeler.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellants regarding the above-noted rejections, we make reference to the answer (Paper No. 10, mailed July 1, 1999) for the examiner's complete reasoning in support of the rejections, and to the brief (Paper No. 9, filed June 7, 1999) and reply brief (Paper No. 11, filed September 7, 1999) for the appellants' arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellants' specification and claims, to the applied prior art references, and to the respective positions articulated by the appellants and the examiner. Upon evaluation of all the evidence before us, it is our conclusion that the evidence adduced by the examiner is insufficient to establish a prima facie case of obviousness with respect to the claims under appeal. Accordingly, we will

not sustain the examiner's rejection of claims 1, 2, 4, 5, 8, 9, 15 and 16 under 35 U.S.C. § 103. Our reasoning for this determination follows.

In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a prima facie case of obviousness. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). A prima facie case of obviousness is established by presenting evidence that would have led one of ordinary skill in the art to combine the relevant teachings of the references to arrive at the claimed invention. See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988) and In re Lintner, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

Claims 5, 8 and 9

The appellants argue (brief, pp. 6 and 8; reply brief, p. 2) that the applied prior art does not suggest the claimed subject matter. Specifically, the appellants assert that the use of residual mass fraction in controlling a vehicle component is not disclosed in or suggested by the applied

prior art. The examiner did not respond to this argument in the answer.

Independent claim 5 reads as follows:

A method for controlling a vehicle component using a plurality of physical sensors for sensing first operating parameters and a controller in communication with the plurality of physical sensors, the method comprising:

monitoring signals generated by the plurality of physical sensors to determine values for the first operating parameters;

processing the values for the first operating parameters using a neural network embedded in the controller to determine a value for residual mass fraction, the value for residual mass fraction being based on a linear combination of the plurality of values for the first operating parameters such that the neural network functions as a sensor for the second operating parameter; and

controlling the vehicle component based on the value of the second operating parameter.^[1]

After reviewing the disclosures of the applied prior art, we reach the conclusion that the subject matter of claim 5 is

¹ We understand the phrase "second operating parameter" used in claim 5 as referring to the previously recited "residual mass fraction." In that regard, we note the appellants' amendment filed November 23, 1998 (Paper No. 6) wherein claim 5 was amended to change "second operating parameter" to "residual mass fraction" in two places.

not suggested by the applied prior art. In that regard, we agree with the appellants that the use of residual mass fraction in controlling a vehicle component is not disclosed in or suggested by the applied prior art.

For the reasons set forth above, the decision of the examiner to reject independent claim 5, and dependent claims 8 and 9, is reversed.

Claims 1, 2, 4, 15 and 16

The appellants argue (brief, pp. 5-6 and 8; reply brief, pp. 1-2) that the applied prior art does not suggest the claimed subject matter. Specifically, the appellants assert that the claimed steps of generating test data during operation of the vehicle component, calibrating a simulator for simulating operation of the vehicle component using the test data, generating at least one map, and embedding the trained neural network into the controller is not disclosed in or suggested by the applied prior art. The examiner disagrees for the reasons set forth in the answer (pp. 3-8).

Independent claim 1 reads as follows:

A method of manufacturing a sensor for use with a vehicle component having a controller in communication with a plurality of physical sensors each generating a signal indicative of first operating parameters, the sensor determining values for a second operating parameter based on values for the plurality of first operating parameters, the method comprising:

generating test data during operation of the vehicle component representative of values for the plurality of first operating parameters for a first set of operating conditions;

calibrating a simulator for simulating operation of the vehicle component using the test data;

generating at least one map which characterizes performance of the vehicle component as a function of predetermined parameters, the map being based on output of the simulator for a second set of operating conditions;

adjusting weights corresponding to nodes of a neural network based on the at least one map so as to develop a trained neural network; and

embedding the trained neural network into the controller by storing a representation of the trained neural network in computer readable media, the representation including a plurality of instructions executable by a microprocessor and data representing the weights corresponding to the nodes of the neural network, such that the trained neural network determines values for the second operating parameter based on values for the plurality of first operating parameters.

After reviewing the disclosures of the applied prior art, we reach the conclusion that the subject matter of claim 1 is not suggested by the applied prior art. In that regard, while

Puskorius '750 does teach (column 5, lines 52-55) that trained networks can be embedded into dedicated neural network hardware chips, the combined teachings of the applied prior art do not teach or suggest the claimed steps of calibrating a simulator for simulating operation of the vehicle component using the test data, generating at least one map which characterizes performance of the vehicle component as a function of predetermined parameters, the map being based on output of the simulator for a second set of operating conditions, and embedding the trained neural network into the controller.

In our view, the only suggestion for modifying Puskorius '700 in the manner proposed by the examiner to meet the above-noted limitations stems from hindsight knowledge derived from the appellants' own disclosure. The use of such hindsight knowledge to support an obviousness rejection under 35 U.S.C. § 103 is, of course, impermissible. See, for example, W. L. Gore and Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

For the reasons set forth above, the decision of the examiner to reject independent claim 1, and dependent claims 2, 4, 15 and 16, is reversed.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1, 2, 4, 5, 8, 9, 15 and 16 under 35 U.S.C. § 103 is reversed.

REVERSED

HARRISON E. McCANDLISH)	
Senior Administrative Patent Judge)	
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)	BOARD OF PATENT
LAWRENCE J. STAAB)	APPEALS
Administrative Patent Judge)	AND
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Appeal No. 2000-0866
Application No. 08/852,829

Page 12

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Appeal No. 2000-0866
Application No. 08/852,829

Page 13

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